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1. A transfer station for releasably, repeatably electrically coupling with respect to a substrate having a plurality of electrical contacts on a substantially flat facing surface thereof, said substrate mounted in a portable cartridge capable  
5 of being engaged by a loader, comprising:

a matching circuitized flexible substrate having electrical contacts on a facing surface thereof, said electrical contacts arranged to match said portable cartridge electrical contacts when in a face-to-face relationship;

10 an elastomeric compression element having a plurality of protruding compression members positioned at a rear surface of said matching circuitized flexible substrate and said protruding compression members facing and in contact with said rear surface, individual said compression members registered with corresponding  
15 individual said electrical contacts;

a reference plate for supporting said elastomeric compression element; and

a loader for engaging said portable cartridge, registering  
said cartridge substrate electrical contacts in face-to-face  
20 relation with said matching circuitized flexible substrate electrical contacts, and exerting a force on said portable cartridge normal to said facing surface of said matching circuitized flexible substrate to cause said portable cartridge substrate to compress said elastomeric compression element

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between said matching circuitized flexible substrate and said reference plate to create non-wiping contact between said electrical contacts of said portable cartridge substrate and said electrical contacts of said matching circuitized flexible  
5 substrate, thereby forming a releasable, repeatable electrical connection therebetween.

2. The transfer station of Claim 1, wherein said electrical contacts of said matching circuitized flexible substrate comprise pads containing gold.

10 3. The transfer station of Claim 2, wherein said matching circuitized flexible substrate comprises copper pads on which are plated a diffusion barrier, and Type II gold pads plated on said diffusion barrier.

4. The transfer station of Claim 3, wherein said gold pads are  
15 plated to a thickness greater than standard.

5. The transfer station of Claim 1, wherein said electrical contacts of said matching circuitized flexible substrate comprise pads containing palladium.

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6. The transfer station of Claim 2, wherein said cartridge loader is arranged to provide said normal force in the amount of at least 30 grams per individual compression member.

7. The transfer station of Claim 1, wherein at least ones of  
5 said electrical contacts of said matching circuitized flexible substrate comprise elongated contacts, each registering with two adjacent said individual compression members of said elastomeric compression element.

8. The transfer station of Claim 1, wherein said reference  
10 plate is substantially flat, providing substantially uniform support of said elastomeric compression element.

9. The transfer station of Claim 1, additionally comprising alignment pins in close proximity to said elastomeric compression element, said alignment pins aligned substantially normal to said  
15 facing surface of said matching circuitized flexible substrate for mating with corresponding alignment holes of said portable cartridge to laterally align said portable cartridge substrate and said matching circuitized flexible substrate.

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10. The transfer station of Claim 9, wherein said alignment pins are tapered to a rounded point in the direction of said portable cartridge substrate to orient said portable cartridge substrate and gradually laterally align said portable cartridge substrate  
5 and said matching circuitized flexible substrate.

11. The transfer station of Claim 9, wherein said alignment pins extend beyond said matching circuitized flexible substrate a distance sufficient to contact a cartridge failing to have said alignment holes, to protect said matching circuitized flexible  
10 substrate from contact with said cartridge.

12. The transfer station of Claim 9, wherein said alignment pins are conductive and coupled to ground to discharge any electrostatic charge at said corresponding alignment holes of said portable cartridge.

15 13. The transfer station of Claim 1, wherein said facing surface of said matching circuitized flexible substrate is oriented parallel to gravity, and said cartridge loader is oriented to provide said force orthogonal to gravity, to minimize debris deposition on said facing surface.

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14. The transfer station of Claim 1, wherein said matching circuitized flexible substrate comprises a termination of a flex cable.

5 15. The transfer station of Claim 14, wherein said flex cable issues from said elastomeric compression element without an immediate change in direction, and subsequently forming a gradual curve in said normal direction to maintain symmetrical force on said matching circuitized flexible substrate as said elastomeric  
10 compression element is compressed.

16. The transfer station of Claim 1, wherein said electrical contacts of said matching circuitized flexible substrate are substantially flat.

17. The transfer station of Claim 1, wherein said electrical  
15 contacts of said matching circuitized flexible substrate comprise shaped contacts.

18. The transfer station of Claim 1, wherein said loader comprises at least one bell crank which rotates to an over-center position, thereby exerting said force on said portable cartridge.

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19. An electrical connector, comprising:

an elastomeric compression element having a plurality of protruding compression members; and

a circuitized flexible substrate having electrical contacts  
5 on a facing surface thereof, at least one of said electrical contacts comprising an elongated contact, said substrate positioned on said elastomeric compression element such that a rear surface thereof is in contact with said protruding compression members, and with individual said electrical contacts  
10 registered with corresponding individual said protruding compression members, and with said at least one elongated contact registered with two adjacent said individual protruding compression members.

20. The electrical connector of Claim 19, wherein said  
15 electrical contacts of said circuitized flexible substrate facing surface comprise pads containing gold.

21. The electrical connector of Claim 20, wherein said circuitized flexible substrate facing surface electrical contacts comprise copper pads on which are plated a diffusion barrier, and  
20 Type II gold pads plated on said diffusion barrier.

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22. The electrical connector of Claim 21, wherein said gold pads are plated to a thickness greater than standard.

23. The electrical connector of Claim 19, wherein said electrical contact of said circuitized flexible substrate facing 5 surface comprise pads containing palladium.

24. The electrical connector of Claim 19, additionally comprising a reference plate positioned at a rear surface of said elastomeric compression element for supporting said elastomeric compression element.

10 25. The electrical connector of Claim 24, wherein said reference plate is substantially flat, providing substantially uniform support of said elastomeric compression element.

26. The electrical connector of Claim 24, for mating with a mating electrical connector, additionally comprising a loader for 15 engaging said mating electrical connector and exerting a force on said mating electrical connector normal to said facing surface of said circuitized flexible substrate to cause said mating electrical connector to compress said elastomeric compression element between said circuitized flexible substrate rear surface 20 and said reference plate.



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27. The electrical connector of Claim 26, wherein said loader is arranged to provide said normal force in the amount of at least 30 grams per individual compression member.

28. The electrical connector of Claim 19, additionally  
5 comprising alignment pins in close proximity to said elastomeric compression element, said alignment pins aligned substantially normal to said facing surface of said circuitized flexible substrate for mating with corresponding alignment holes of a mating electrical connector to laterally align said mating  
10 electrical connector and said circuitized flexible substrate facing surface.

29. The electrical connector of Claim 27, wherein said alignment pins are conductive and coupled to ground to discharge any electrostatic charge at said corresponding alignment holes of  
15 said mating electrical connector.

30. The electrical connector of Claim 19, wherein said facing surface of said circuitized flexible substrate is oriented parallel to gravity to minimize debris deposition on said facing surface.

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31. The electrical connector of Claim 19, wherein said circuitized flexible substrate comprises a termination of flex cable.

32. The electrical connector of Claim 31, wherein said flex  
5 cable issues from said elastomeric compression element without an immediate change in direction, and subsequently forming a gradual curve in said normal direction to maintain symmetrical force on said flex cable at said facing surface upon compression of said elastomeric compression element.

10 33. The electrical connector of Claim 19, wherein at least one of said electrical contacts of said facing surface is coupled to a source of data, and wherein at least another of said electrical contacts of said facing surface is coupled to a power supply.

34. The electrical connector of Claim 19, wherein said at least  
15 one elongated electrical contact of said circuitized flexible substrate is substantially flat.

35. The electrical connector of Claim 19, wherein said at least one elongated electrical contact of said circuitized flexible substrate comprises a shaped contact.

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36. A portable cartridge for mating with a transfer station, said transfer station having a data transfer interface with electrical contacts on a compression element and having a cartridge loader, said cartridge comprising:

5 a data handling agent;

a substrate having electrical contacts on a substantially flat facing surface thereof, said electrical contacts arranged to match said transfer station data transfer interface electrical contacts when in a face-to-face relationship, said substantially  
10 flat substrate coupled to said data handling agent; and

a cartridge shell supporting said data handling agent and said substantially flat substrate, said cartridge shell having at least one engagement surface for engagement by said cartridge loader in said transfer station, whereby said cartridge loader  
15 may engage said cartridge, register said cartridge electrical contacts in face-to-face relation with said transfer station data transfer interface electrical contacts, and exert a force on said cartridge normal to said facing surface of said transfer station data transfer interface to cause said portable cartridge  
20 substrate to compress said compression element to create non-wiping contact between said electrical contacts of said portable cartridge substrate and said transfer station data transfer interface facing surface, and forming a releasable, repeatable electrical connection therebetween.

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37. The portable cartridge of Claim 36, wherein said electrical contacts of said substantially flat substrate facing surface comprise pads containing gold.

38. The portable cartridge of Claim 37, wherein said  
5 substantially flat substrate facing surface electrical contacts comprise copper pads on which are plated a diffusion barrier, and Type II gold pads plated on said diffusion barrier.

39. The portable cartridge of Claim 38, wherein said gold pads are plated to a thickness greater than standard.

10 40. The portable cartridge of Claim 36, wherein said electrical contacts of said substantially flat substrate facing surface comprise pads containing palladium.

41. The portable cartridge of Claim 36, wherein at least ones of  
said electrical contacts of said substantially flat substrate  
15 facing surface comprise elongated contacts.

42. The portable cartridge of Claim 36, wherein said transfer station additionally comprises alignment pins, said portable cartridge additionally comprising alignment holes in close proximity to said substantially flat substrate, said alignment

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holes arranged for mating with corresponding said transfer station alignment pins to laterally align said portable cartridge substrate and said transfer station data transfer interface facing surface.

5 43. The portable cartridge of Claim 36, wherein said substantially flat substrate comprises:

a backing plate; and

a termination of a flex cable mounted on said backing plate, and forming said substantially flat facing surface, said flex

10 cable coupled to said data handling agent.

44. The portable cartridge of Claim 43, wherein said flex cable comprises a plurality of lands coupled to said flat electrical contacts of said facing surface at said termination, and wherein said flex cable is also coupled to a power input of said data  
15 handling agent to provide power from said transfer station to said data handling agent.

45. The portable cartridge of Claim 36, wherein said electrical contacts of said substantially flat substrate facing surface are substantially flat.

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46. The portable cartridge of Claim 36, wherein said electrical contacts of said substantially flat substrate facing surface comprise shaped contacts.

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47. A matching electrical connector for mating with an electrical connector having electrical contacts on a facing surface of a substrate, said substrate overlying protruding compression members of a compression element, said matching  
5 electrical connector comprising:

a substrate having a substantially flat facing surface thereof; and

a plurality of electrical contacts on said substantially flat facing surface of said substrate, at least one of said  
10 electrical contacts comprising an elongated contact which, when said substrate is registered in face-to-face relation with said mating electrical connector facing surface, is positioned to overlie two adjacent said individual protruding compression members of said mating electrical connector compression element.

15 48. The matching electrical connector of Claim 47, wherein said electrical contacts comprise pads containing gold.

49. The matching electrical connector of Claim 48, wherein said electrical contacts comprise copper pads on which are plated a diffusion barrier, and Type II gold pads plated on said diffusion  
20 barrier.

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50. The matching electrical connector of Claim 49, wherein said gold pads are plated to a thickness greater than standard.

51. The matching electrical connector of Claim 47, wherein said electrical contacts comprise pads containing palladium.

5 52. The matching electrical connector of Claim 47, wherein said substrate comprises:

a backing plate; and

a termination of a flex cable mounted on said backing plate, and forming said substantially flat facing surface.

10 53. The matching electrical connector of Claim 52, wherein said backing plate is arranged to support said flex cable termination and to transmit an applied force to said flex cable termination, when registered in said face-to-face relation, to thereby exert said applied force toward said mating electrical connector facing  
15 surface.

54. The matching electrical connector of Claim 47, wherein said substrate is arranged, when registered in said face-to-face relation, to exert an applied force toward said mating electrical connector facing surface.



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55. The matching electrical connector of Claim 47, wherein said at least one elongated electrical contact is substantially flat.

56. The matching electrical connector of Claim 47, wherein said at least one elongated electrical contact comprises a shaped  
5 contact.